

This listing of claims replaces all prior versions, and listings of claims in the instant application:

Listing of Claims:

1. (Previously presented) A molding die for molding an integrated optical circuit (IOC), said IOC including at least one optical waveguide, the molding die comprising:
a substrate having a topographically patterned first surface, wherein said first surface includes at least one wall having a top and a bottom, and at least one intermediate step in the wall between the top and bottom; and
a conformal protective film provided over said first surface including over said wall and said at least one step, said film having a outer second surface, wherein said second surface forms a negative copy of the IOC to be molded using the molding die, and said outer second surface is curved between the top and bottom of the wall of the substrate and over the at least one intermediate step.
2. (Canceled)
3. (Previously presented) The molding die of claim 1, wherein said protective film is selected from the group of metal, aluminum oxide, and diamond, and said substrate is made of material selected from the group of silicon, silicon-nitride, silicon carbide, and gallium arsenide.
4. (Canceled)
5. (Currently amended) The ~~tool~~ molding die of claim 1, wherein said substrate is made of material

selected from the group of silicon, silicon-nitride, silicon carbide, and gallium arsenide.

6-11. (Canceled)

12. (Previously presented) A method for making a substrate for molding an IOC, said IOC including at least one optical waveguide, the method comprising:

providing a substrate, said substrate having a first surface;

patterning said first surface so that said first surface has a topographical pattern, wherein said patterned first surface includes at least one wall having a top and a bottom, and said first surface includes at least one intermediate step in the at least one wall between said top and said bottom; and

providing a conformal protective film over the topographical pattern of the first surface including over said at least one wall and said at least one intermediate step, said film having an outer second surface, wherein said second surface forms a negative copy of the IOC to be molded using the molding die and said outer second surface is curved between the top and bottom of the at least one wall of the substrate and over the at least one intermediate step.

13. (Original) The method of claim 12, wherein said protective film is metal and is provided by plating the metal onto said first surface.

14-23. (Canceled)

24. (Previously presented) A method for compression-molding an IOC, said IOC including at least one optical waveguide, the method comprising:

providing a molding die comprising at least one substrate having a topographically patterned first surface, wherein said patterned first surface includes at least one wall having a top and a bottom, and said first surface includes at least one intermediate step in the at least one wall between said top and said bottom, and a conformal protective film provided over said first surface including over said at least one wall and said at least one intermediate step, said film having an outer second surface, wherein said second surface forms a negative copy of the IOC and said outer second surface is curved between the top and bottom of the at least one wall of the substrate and over the at least one intermediate step;

providing a holding substrate with a surface;

providing a moldable first material on said holding substrate;

heating one or both of said molding die and said first material;

pressing said patterned second surface into said first material at a selected pressure, thereby molding a patterned IOC surface; and

curing the first material.

25. (Original) The method of claim 24, wherein said protective film is made of material selected from the group of metal, aluminum oxide, and diamond.

26. (Previously presented) The method of claim 25, wherein said substrate is made of material selected from the group of silicon, silicon-nitride, silicon-carbide and gallium arsenide.

27. (Original) The method of claim 24, wherein said first material is optically transmitting.

28. (Original) The method of claim 24, wherein said IOC surface includes at least one channel, and the method further comprises:

providing a moldable second material, said second material being optically transmitting and having an optical index of refraction that is higher than that of said first material;

filling at least one channel in said IOC surface with the second material; and

curing the second material.

29. (Previously presented) The method of claim 24, wherein said first material comprises a plurality of layers, said layers including an optically transmissive surface layer for transmitting optical signals that is pressed and an optical confinement layer located beneath said surface layer, said confinement layer having an index of refraction that is less than that of said surface layer.

30-34. (Canceled)

35. (Previously presented) A method for molding an IOC, said IOC including at least one optical waveguide, the method comprising:

providing a mold having a cavity defined by an interior surface;

providing at least one substrate having a topographically patterned first surface, wherein said patterned first surface includes at least one wall having a top and a bottom, and said first surface includes at least one intermediate step in the at least one wall between said top and said bottom, and a conformal protective film provided over said first surface including over said at least one wall and said at least one

intermediate step, said film having an outer second surface, wherein said second surface forms a negative copy of the IOC, and said outer second surface is curved between the top and bottom of the wall of the substrate and over the at least one intermediate step, said substrate being applied onto said interior surface with said second surface facing towards the cavity;

injecting a moldable first material into the cavity so that said first material contacts and conforms to said second surface, thereby molding a patterned IOC surface;
curing the first material; and
removing the first material from said cavity.

36. (Original) The method of claim 35, wherein said first material is optically transmitting.

37. (Original) The method of claim 35, wherein said IOC surface includes at least one channel, and the method further comprises:

providing a moldable second material, said second material being optically transmitting and having an optical index of refraction that is higher than that of said first material;

filling at least one channel in said IOC surface with the second material; and

curing the second material.

38. (Previously presented) The method of claim 35, wherein said protective film is made of material selected from the group of metal, aluminum oxide, and diamond, and said substrate is selected from the group of silicon or gallium arsenide.

39-43. (Canceled)